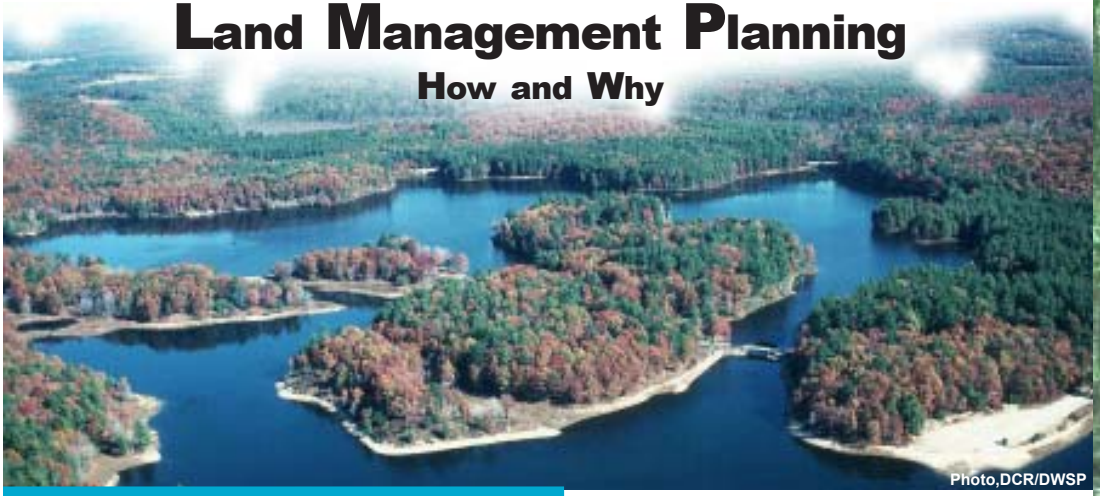
Water Supply Land Management Planning

How and Why



Photo,DCR/DWSP

A strategy that addresses land management issues is essential to water quality in a water supply like the Quabbin Reservoir shown above.

An essential ingredient for effectively managing lands in an environmentally sound manner is the development of a Land Management Plan (LMP). The Department of Conservation and Recreation's Division of Water Supply Protection, Office of Watershed Managemnent (DWSP/OWM), and its predecessor, the Metropolitan District Commission, has been writing Land Management Plans for almost 50 years.

DWSP/OWM's primary purpose is the long term protection and maintenance of water quality in the Quabbin and Wachusett Reservoirs, the source of drinking water for 2.2 million people. DWSP Land Management Plans help achieve this goal by outlining management objectives that establish and maintain an effective and practical watershed cover that maximizes the natural filtering capability of the landscape. The first LMP, written in 1960 by Fred Hunt, a Quabbin forester, stated, "an

PLANNING - CONTINUED ON PAGE 3

A 40-Year Look Back

with DCR Forester Bruce Spencer

Many people harbor a vague dream of life in the Great Outdoors; a life of flannel shirts, fresh air, and freedom. Few such fantasies include hours spent in physical labor in a forest abuzz with mosquitoes and deerflies, or carpeted in three feet of snow.

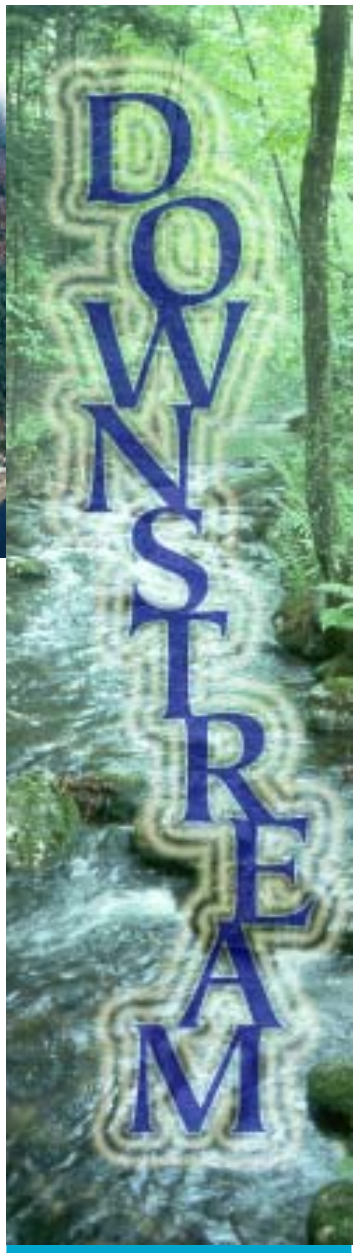
For Bruce Spencer, who has spent 40 years as Chief Forester for the DCR and MDC, a life's work in the forest was not a fantasy; it was a plan.

"I was always interested in the forest," Bruce says. "No one taught me; it was something I always gravitated to, thinning and cutting trees. I was running my first

Bruce Spencer - SEE PAGE 4

In This Issue:

Research tells us that the best quality drinking water is derived from lands that are left in a natural state. A side-effect of this is the quality of life benefits that result from the protected open space. However, nature, being what it is, constantly changes. Thoughtful strategy and direct action are both necessary to protect water quality from natural processes as well as from the impacts of people. This issue of *Downstream* looks at the process and the people of DWSP land management.



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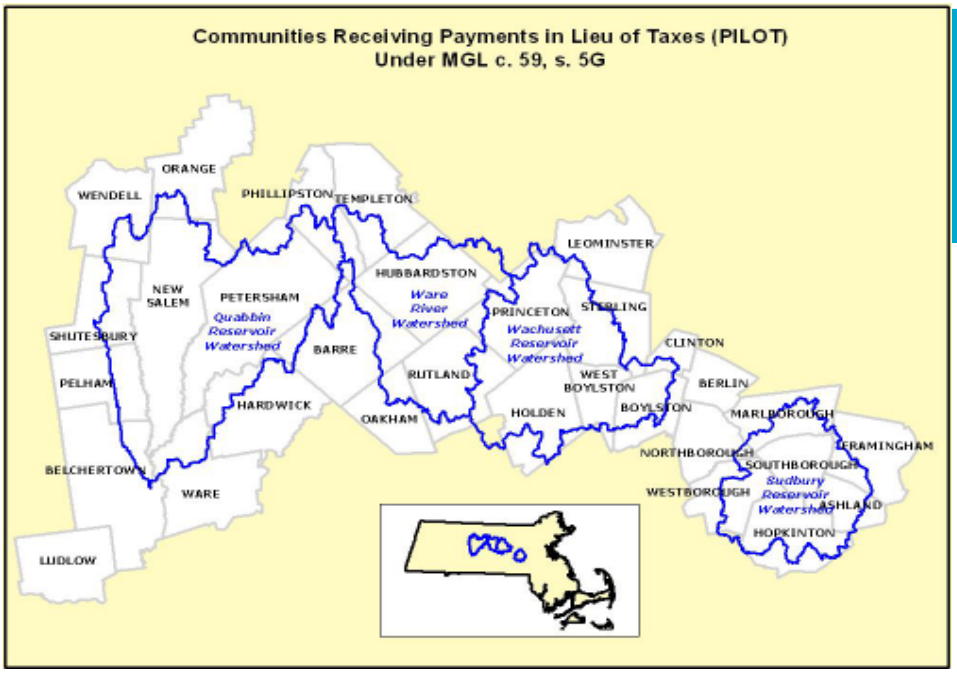
www.mass.gov/dcr/waterSupply.htm

DCR PILOT Program - The Basics on Payments in Lieu of Taxes



Communities shown here are within the DCR PILOT Program area. The DCR makes annual payments for watershed protection acreage, based upon valuation by the Department of Revenue and local tax rates.

DCR's Division of Water Supply Protection is mandated by Massachusetts General Laws Chapter 59, Section 5G to make Payments Lieu of Taxes (PILOT) on over 100,000 acres of Commonwealth property managed by the Office of Watershed Management. This legislation updated the original payment laws passed in the 1940s. The current law was ratified in 1984 for the Quabbin Reservoir and Ware River Watersheds and was amended in 1987 to include communities in the Wachusett and Sudbury Reservoir Watersheds. Since 1990, over $51 million has been distributed in watershed protection PILOT payments. FY05 PILOT was $5.1 million; for a complete listing for each of the 31 watershed communities, go to www.mass.gov/dcr/waterSupply/watershed/pilot.htm.

Funds for the DCR PILOT payments come from Massachusetts Water Resources Authority (MWRA) rate payers who use the reservoir waters; the MWRA provides funding to the DCR to make PILOT payments to the watershed towns. Unlike other PILOT programs for state-owned lands, which are disbursed through the State's Local Aid program ("Cherry Sheets") and have been subject to funding cuts, the DCR program is paid in full directly to each community.

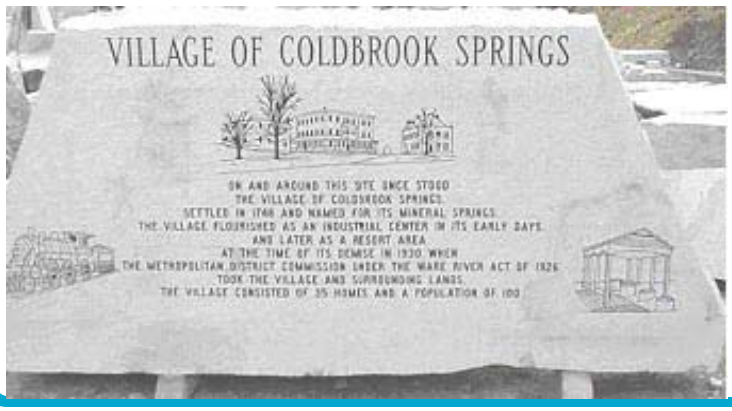
Legislation dictates that these payments in lieu of taxes be based on the MA Department of Revenue (DOR) valuations that are calculated once every five years. The DOR values DCR watershed land as either a prime lot (the area and frontage required for a building lot), rear land, or unbuildable land. The PILOT amount is then determined by multiplying the DOR figure by each community's commercial tax rate. In other words, DCR's permanently protected open space is valued as if it is still potentially developable land and then the PILOT is calculated using the same rate structure as commercial or industrial property. A very important aspect of the legislative provisions is that the PILOT payment can never be less than the previous year, even if there is a drop in the land valuation or the local tax rate.

The DOR revaluation is a critical element in determining the cost of PILOT. The last revaluation in 2000 resulted in a 57% increase total PILOT, raising the total payment from $3.1 million in FY2000 to $4.9 million in FY2001. DOR is currently completing its 2005 revaluation process, which will take effect in the FY06 PILOT. It is estimated that PILOT will increase approximately 25%, to over $6 million. The final PILOT amount is dependent on both the DOR valuation and local tax rates, which will not be available for several months. A future issue of *Downstream* will have a PILOT update, or visit the DCR website listed above.

-Joel Zimmerman, DCR/DWSP Regional Planner

- A Dedication -

This granite monument, measuring 7 feet by 5-1/2 feet, was unveiled at a dedication in remembrance of the former village of Coldbrook Springs. The dedication took place on Saturday, June 18, 2005 at Coldbrook Road and Rt. 122 in Oakham. Local dignitaries and former residents spoke about this lost village, one of the seven towns and villages taken by the state for the Quabbin Reservoir project during the 1930s. The dedication was sponsored by the Oakham Historical Commission, the Oakham Historical Association, and the Department of Conservation and Recreation. For more information call Bill Mucha at 508-882-5284.



Photo, Bill Mucha

PLANNING - FROM PAGE 1

ideal watershed forest would have many age classes, many species well suited to the site, medium density, good vigor and quality, and high wildlife and aesthetic value." This description is still relevant to DWSP's present day forest management.

DWSP Land Management Plans are ten year guides, setting goals and identifying strategies for water quality protection. These LMPs include sections on: 1) mandates and statement of mission; 2) a description of watershed resources; 3) watershed management principles and goals; 4) management plan objectives and methods; 5) research inventory and monitoring needs; and 6) the public review process. The plan is written so that the management plan components are based on the sections that precede them. The LMPs are "adaptive watershed management plans," an implementation process that allows for updating and modification as properties are acquired or new information comes to light.

The LMP highlights five major objectives: land protection, forest management, wildlife management, management and protection of biological diversity, and cultural resource protection.

The first objective, **land protection**, includes fire protection, boundary maintenance, access maintenance, and land acquisition. DWSP has an active land acquisition program geared toward obtaining control, either through fee acquisition, conservation restrictions, or other care and control agreements, of key parcels in these water supply watersheds. Since the Quabbin and Ware River watersheds have a significant amount of land under DWSP control (57% and 37%, respectively), DWSP concentrates its land acquisition within the Wachusett watershed (29% control), which continues to face development pressure.

The location, marking and maintenance of the boundaries of OWM watershed lands are also important land protection activities, since clear boundaries allow for better control over illegal activities that could threaten watershed integrity. Effective resolution of boundary encroachments is an integral part of boundary maintenance.

DWSP land management plans primarily focus on **forest management.** The forest cover on much of the water supply watershed lands is maintained as a species diverse, multi-layered forest. Although LMPs are written for a ten year period, they also project the forest cover and watershed conditions 60 years or more into the future. This long range view is important because it plans for the future integrity of the "land/forest filter" in case of events such as hurricanes, floods, fires, insect and disease outbreaks, environmental pollution, and other impacts unknown to managers today. In 1997, the forest management program at the Quabbin Reservoir watershed became the first "Green Certified" public land in North America. Green Certification is the designation for sustainable and environmentally sound forest management practices given by the independent Forest Stewardship Council.

The planning process involves a clear understanding of issues described by staff professionals as well as outside advisory groups. Photo, Clif Read

The **wildlife management** program performs a dual role of mitigating potentially adverse impacts of wildlife on water quality while also protecting uncommon, rare and otherwise significant wildlife species and habitats. Wildlife impacts that can be detrimental to water quality result from geese residing on the reservoir, roosting gulls, and deer over-browsing the forests. DWSP wildlife staff also manage to protect significant wildlife species, like the bald eagle and common loon, whose presence does not impact water quality. The Division's forestry management activities are also monitored to assess, and mitigate, any potential impacts to wildlife. Proactive habitat management and care for unique and exemplary natural communities are additional objectives of the wildlife program.

Protecting these unique natural communities is a major part of DWSP's **management for biological diversity**. DCR staff are active in identifying uncommon or rare species on DWSP lands. DWSP also designates "Areas of Special Management Restrictions" where management and other human activities are restricted. These designations are especially appropriate on sites where topography, hydrology, vegetation, resource sensitivity or other characteristics limit active management. While most of DWSP lands are kept in a forested state, some lands are maintained as fields or early successional forest to help promote habitat diversity.

Throughout the watershed lands there are a wide variety of historical and pre-historical resources. The **cultural resource protection** section identifies these fragile and non-renewable resources. DWSP makes a concerted effort to identify significant cultural resources on agency land and modify land management practices to prevent degradation of these important links to our past.

DWSP has recently completed the Land Management Plan for the Sudbury Reservoirs and has begun updating the LMP for the Quabbin Reservoir Watershed. The Division values input from the public and holds periodic public meetings over the course of the drafting of our plans. To provide input or ask questions regarding the updating of the Quabbin Land Management Plan, you can send email to: Quabbin.publicinput@state.ma.us or by contacting the project manager Thom Kyker-Snowman at (413) 323-7254 x551. Readers wishing to learn more about DWSP plans, including public access plans and watershed protection plans, can visit www.mass.gov/dcr/waterSupply/watershed/dwmplans.htm .

-Peter Church, DCR/DWSP Natural Resources Section Director.

Bruce Spencer -FROM PAGE 1

timber sales on our family-owned land (in East Freetown, Mass.) by the time I was 15." The difficulties of maintaining high standards of forest management were immediately apparent. "The first guy who came to take the trees figured 'this kid doesn't know any different,' and tried to take some trees that weren't marked. I threw him off the job."

A few years later, Bruce added professional credentials to his practical experience by earning a Bachelor's Degree in Forest Management at UMass Amherst. During the summers of his Junior and Senior years he worked in the Pacific Northwest, first marking and thinning stands of ponderosa pine and fighting fire in northeastern Oregon, and then doing forest inventory work "on the wet side," at higher elevations in the Cascades. For the young man from Massachusetts, the two summers were instructive. "It was a very different culture: just sawmills, ranchers, foresters, and the Forest Service. Big forest fires. Isolated towns. Parties you wouldn't believe."

Bruce returned to UMass to take his Master's Degree, and while he was finishing his thesis (on the relationship of soil productivity on tree growth and water yields) the door to his professional future suddenly opened wide. MDC forester Fred Hunt decided to leave Massachusetts for a job with the US Forest Service. According to Bruce, "The MDC came to UMass looking for a forester to take Fred's place. I just happened to be at UMass getting my Master's degree, and I was the first person they bumped into. It was pure luck. Being in the right place at the right time."

It was a rapid transition from 23-year-old graduate student to the only forester on about 84,000-acres. "I had only one brief day with Fred, seeing what was going on. And there was a lot going on! There were 3 or 4 sawmills working and several other logging jobs on the Quabbin and the Ware River, and I didn't know if I was going to be able to find them again." (Note: as anyone who has ever worked with Bruce will attest, this was probably the first and last time anyone has doubted his ability to find anything, anywhere, and by the best cross-country route.)

After that first and only day with Fred Hunt, Bruce hit the ground running. It was his responsibility to "mark" sales on all three watersheds - to choose each tree that would be included as part of a timber sale and mark it with paint - and to accurately estimate the volume of timber in each delineated sale area or "lot" before putting it out for bidding by private sawmills or loggers. After a lot was sold, it was up to Bruce to oversee the operation. Bruce's first Quabbin lots went out to bid two months after he started his new job.

The summer inventory work in the Pacific Northwest was good training for the 300-plus Continuous Forest Inventory Plots (CFI) at Quabbin; a grid of permanent plots that must be revisited and inventoried every 5 or 10 years. "That first year I started was the 5th year since Fred established the plots, so after the

Bruce Spencer on a perfect day at work: in the woods, marking trees.

Photo, Marcheterre Fluet

A Far-Reaching Influence on Future Forests

Umass Amherst professor Professor Paul Barten says, "Bruce Spencer has substantially influenced the professional development of several generations of forestry students in southern New England. Students visit the Quabbin Forest and learn: 'Don't hide sustainable forest management from the public...know that logging is very difficult work...be clear and consistent with your expectations...protect the soil...build equity in the forest...leave the next forester with more options than you had.' I sometimes think that Bruce accomplishes more in 3 hours than I do in 3 months."

John O'Keefe, Fisher Museum Coordinator at Harvard Forest, was a UMass student on just such a Quabbin field trip more than 25 years ago and recalls, "Bruce's enthusiasm and commitment impressed me immediately." They have since worked together on numerous projects with forestry organizations and the Mount Grace Land Conservation Trust. John says, "My respect for Bruce's insight and generosity has only grown. The 'Living Endowment' program, through which landowners can donate woodlots to Mount Grace to be sustainably managed in perpetuity, is a perfect example of Bruce's innovative thinking and commitment to excellent forestry."

Photo,DCR/DWSP

Wildlife Trees

Bruce Spencer stands by a "wildlife tree" which, throughout long years of gradual decline and decay, has provided needed habitat for cavity-dwelling species ranging from birds to bears. In profit-driven forestry operations, trees with no commercial value would typically be removed to make growing room available. Thousands of cavity trees are deliberately retained for wildlife in forestry operations at Quabbin Reservoir, Ware River, and Wachusett Reservoir Watershed.

growing season was completed I started remeasuring all the plots. Not only to get an idea of what the whole watershed was like, but also to get out and see what was happening, see what the growth was, because CFI does tell you a lot about the growing conditions on different sites." Remeasuring the plots involved walking almost the entire watershed, in winter, and recording data on individual trees in 1/5-acre plots every half-mile. "It was a really good exercise," says Bruce. "I was done sometime in the spring."

There was always someone willing to test the Quabbin forester, especially in the early years. Bruce recalls the day a nearby landowner called to ask why the local brook was running brown. Bruce investigated and discovered that a logger on a Quabbin lot had ignored the forester's carefully laid-out routes. "He decided a shortcut would be to drive down the brook. It was incomprehensible! But I knew he'd never dealt with foresters before. I was bringing something new to him, but something very important to us. You don't run skidders in the brook, you don't bark up trees...I remember early on, when the skidder came on the scene and some loggers would say, 'That barking of trees is not a problem. The tree will heal up. Why are you worrying about that?' But as a forester, when you're marking, you take every tree you mark seriously. So you also take every damaged tree seriously. It's necessary to convey to the loggers what is important to you, and why; 'You're here to cut the logs but you've got to do it so we're left with a good resource, and with undamaged soils and residual trees.'"

Bruce's ability to convey the importance of excellent management practices extends far beyond the watershed boundaries and the private loggers who must continue to meet high standards in order to work on DCR lots. Field tours of Quabbin forestry operations, led by Bruce, are a valued component of Forestry classes at Yale and UMass. Foresters and researchers from Europe and Japan have made the trip to Quabbin - hardly on the beaten path of international tourism - to see firsthand what management can accomplish when economic gain takes a backseat to long-term preservation and improvement of forest resources.

"Silviculture can be used in so many different ways, but I've always believed that in the purest sense it can be used to upgrade the forest and to make it more productive over time. For water quality, wildlife habitat, and forest products." Looking back, Bruce says, "In some cases it was easy. We had stands that had grown up in open conditions, like pasture pine stands, and by getting rid of the really deformed trees that had very little value and leaving the better trees, we gave the forest a chance. Today those stands are unrecognizable, becaue we left good trees to grow. Many of those loggers understood what we were trying to accomplish, and they believed that someday, hopefully, they would come back and cut better trees. Without their skill and their effort, we couldn't have accomplished what we did.

"I look at some of the sites where I put these guys early on, where we were doing thinnings on some difficult places, and I don't think we could do the same thing today and do it as well, because we don't have that small equipment; the portable sawmills and the crawler-tractors that preceded the skidders. Back then they could utilize the really low-quality pine because there was still a market for the box pine and for posts.

"Nothing was perfect, and we all made mistakes. But nothing *is* perfect. And we've obviously learned a lot more. Soils were always an important consideration; even a crawler-tractor can cause problems in soft soils, and you can't just pick up a

Regrowth

Clif Read of the Quabbin Visitor Center gets a first-hand look at the process of collecting regeneration data with Bruce Spencer. Foresters take hundreds of "regen" plots across the Quabbin watershed each year; these plots are a valuable forest monitoring tool.

Photo,DCR/DWSP

Book Review

Here is a book that you may want to consider if you are interested in learning how the natural environment has changed over time.

New England Forests Through Time

By David R. Foster and John F. O'Keefe

The detail dioramas of Harvard Forest at the Fisher Museum in Petersham, Massachusetts provide a unique view into the history New England's forests up to about 1930. David Foster and John O'Keefe describe these amazing works of art and the valuable scenes they depict to highlight important moments in the use and management of forests.

Over 300 years are covered in different stages at the same location. The scenes begin with the pre-settlement 17th century forest with its diverse old-growth of broad leaf and coniferous tree, open sections due to fire or blowdown, and rocky ledges with thin soil species. The forest is slowly cleared by early settlers in the mid-1700s with the height of the cleared areas occurring in the mid-1800s when about 75% of this area was unforested.

The forests began to grow back as farmers abandoned their lands. They were attracted to the more fertile crop land in the Midwest and to more lucrative employment in the mills. This second growth timber was harvested in the early 1900s and once again much of the land was cleared.

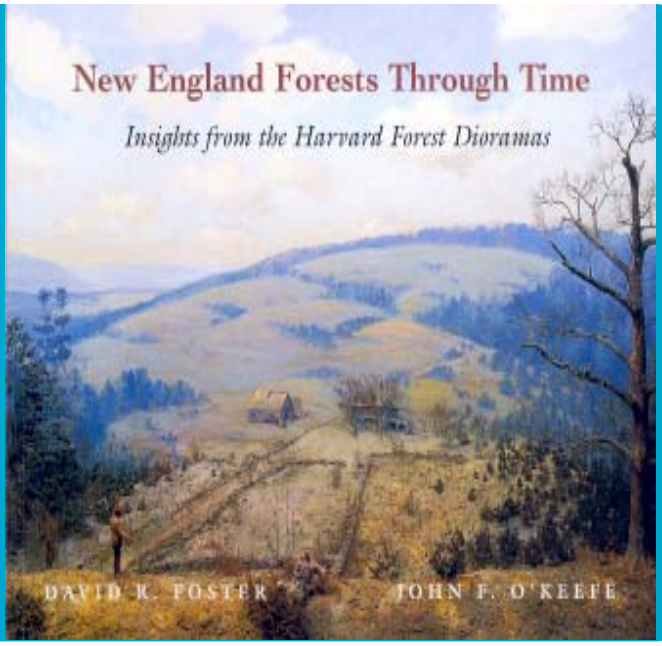
Some of the conservation issues and management techniques of the time are also covered in the dioramas. The number of wildlife species changed as their habitats were impacted by forest use. Some of the early, intensive practices are no longer used today due to changes in forestry.

Richard Fisher, one of the people who conceived the idea for the dioramas, was also a Harvard University professor of forestry. He developed a comprehensive approach to forest management called "ecological forestry." These early efforts by Fisher and his students have evolved into our present silvicultural practices.

New England Forests Through Time is an outstanding starting point for those interested in the New England forest, as it is brief yet filled with detailed information. The authors have included an excellent annotated bibliography of suggested books for further study. Visiting the Fisher Museum to view the dioramas is highly recommended. For more information go to http://harvardforest.fas.harvard.edu/museum/dioramas.html.

-Jim Lafley, DCR Educational Coordinator

This image of the book's cover shows one of the models on display at the Harvard Forest, which is easily found on Route 32 in Petersham, Massachusetts. For more information about the Harvard Forest, call (978) 724-3302 or see their Website at www.harvardforest.fas.harvard.edu.



Bruce Spencer -FROM PAGE 5

sawmill and move it and then bring it back later to finish the job. So we'd plan jobs to have work going on in the wet areas when the ground would be frozen, and have dry areas to work on when we knew the loggers would be running into the spring season. But early on we weren't taught anything about salamanders and reptiles and vernal pools, so there's been a lot of new knowledge come about."

Bruce has worked with all but the first Superintendent of Quabbin, and says, "I wasn't given much instruction and I didn't need a whole lot. I was self-motivated. The only land management plan we had at the beginning was Fred Hunt's, and then I wrote the second one in the 70s." Over a career of forty years managing one forest - very unusual in professional forestry circles, even in the Forest Service - inevitable contraversies have arisen. Two that come immediately to mind are the proposed Connecticut River Diversion, and the Quabbin Deer Hunt. "What helped me in dealing with both bureaucracy and with loggers, is that my focus was on the resource and on getting the job done. I've worked with a lot of skilled people and I've worked with lots of really tough people. My energy and talk always focused on the trees, the soils; 'this is what we have to do.' There are so many ways to approach things," Bruce insists. "We are all thrown monkey wrenches and road blocks, all the time. You don't give up. You just think and you find a way. There are infinite ways to try to accomplish something.

"What has served me well, and serves all our foresters well, is recognizing that we're working with this wonderful resource that in most cases we had nothing to do with establishing; it came before us. We are aware of that and of the need to be sensitive and try to accomplish our goals without taking too much from the forest. How much to leave and how much to take - that's what sustainability is all about.

"My personal view of forestry hasn't really changed. It's trying to leave things better instead of worse. That's the goal."

-Marcheterre Fluet, DCR Regional Planner

Want to Get Involved?

If you have an interest in the local environment and want to help, meet new people and have fun, here are a few organizations that might answer your calling:

In the Wachusett Reservoir area,

Friends of Wachusett Watershed
P.O. Box 14
Oakdale, MA 01539
(978) 422-7579

Wachusett Greenways
P.O. Box 121
Holden, MA 01520
(508) 829-3954

In the Quabbin Reservoir area,

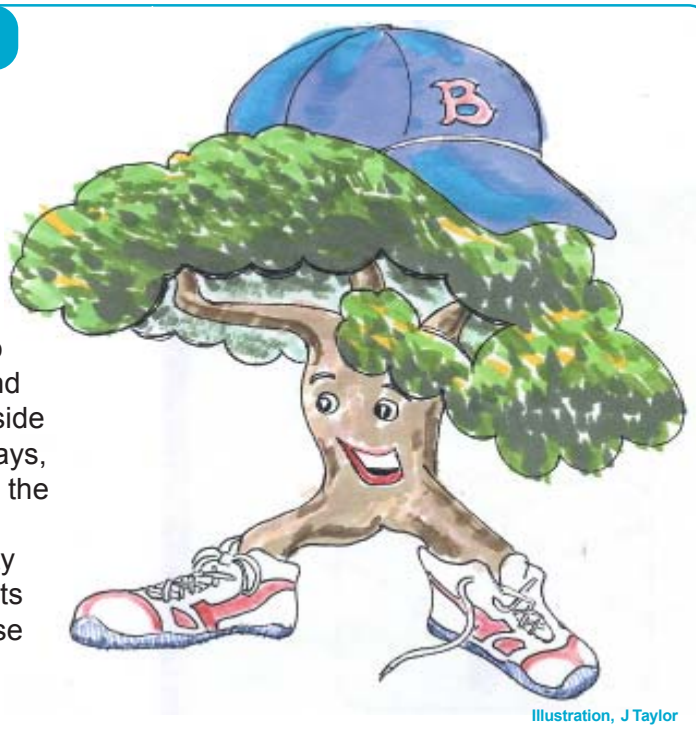
Swift River Valley Historical Society
40 Elm Street,
New Salem, MA 01355
(978) 544-6882

Friends of Quabbin Reservoir
485 Ware Road,
Belchertown MA 01007
(413) 323-7221,
Email:admin@friendsofquabbin.org
http://www.foquabbin.org/

That's one of those foresters... and he's out standing in his field!

KIDS CORNER

The "How To Be a Tree" Game



Illustration, J Taylor

Have you ever wondered what it might be like to be a tree, to stand in one place outside and watch the days, the weather, and the animals go by? Here is an activity for kids and adults that gives a sense of a tree's life.

Materials You Will Need: Index cards, pen or pencil, a few friends, your imagination.

Game Objective: To portray the actions of the forest environment through creative dramatics.

How to Play: As a group, list the following items on separate cards:

> Gentle breeze; Violent windstorm; Gentle rain; Rainstorm with thunder and lighting; Snowstorm; Forest fire; Squirrel running up a tree trunk; Bird building a nest in the tree branches; Person climbing in a tree; Person carving on the bark; Person planting a tree; Logger harvesting the tree.

Try to think of some of your own tree related actions that would be fun to act out and add write them on separate cards too.

Let The Game Begin: Shuffle the cards face down. Have each player choose a card and keep it a secret. If a player is unable to read, an adult or older child can help read the card. Take a few moments to decide how to portray the action on the card. The other players have to guess what the actor is doing.

After All the Cards Have Been Played: Using the cards, create a story about a forest in which the trees experience the events similar to those already individually acted out. As the story goes on, all of the players act out the events as they occur. But be careful – it might get hilarious if there is a hurricane!

A Note to the Big Folks: This activity will work well if led at a play group or as a party game. This idea may also be the basis for a puppet show in which forest trees, plants and animals portray activities related to their home in the forest during different seasons or events like those listed on the index cards.

For more information contact Jim Lafley, Education Coordinator, DCR -Division of Water Supply Protection, Office of Watershed Management, 508-792-7423 x 231 or Jim.Lafley@state.ma.us.

Trees - A Renewable Resource

The first priority for DCR foresters is selection of trees for thinning and potential hazard control with regard to overall forest vigor. After trees are selected for this purpose, the most effective method for their removal is to sell standing timber to commercial loggers who harvest and bring cut wood to the commercial market.

The typical tree harvested for forest product use is usually between 40 and 80 years old. Roughly 12, 8"diameter trees will yield a cord of wood. A cord of wood is a stack 4 feet high, by 4 feet wide by 8 feet long.

One cord of wood will provide the equivalent BTU's (the standard measure of heat) of 120 to 160 gallons of home heating oil depending on the wood species. The efficiency of the oil burner and the wood stove must be considered to make a more accurate comparison. This may give you something to think about in these energy concious times.

The construction of a typical 1,800 square foot house will require about 20 cords of wood.

In manufacturing, one cord of wood can make the following:

942 one-pound books
OR
61,370 standard envelopes
OR
460,000 personal checks
OR
89,870 sheets of letterhead
OR
1,200 copies of National Geographic
OR
250 copies of the New York Times
OR
12 dinning room tables for 8
OR
4,000 one-gallon milk cartons

Photo,DCR/DWSP

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